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A TV RECEIVER PROVIDING ALTERNATIVE AUDIO TRACKS FOR A PROGRAM

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A TV RECEIVER PROVIDING ALTERNATIVE AUDIO TRACKS FOR A PROGRAM

BACKGROUND OF THE INVENTION

A. Field of The Invention

This invention pertains to a video signal processor such as a TV receiver that processes a secondary audio program (SAP) channel with an alternative audio track in accordance with viewer preferences regarding the program content or viewer demographic information such as geographic location.

B. Description of the Prior Art

Early TV receivers received only a few program channels having a single mono audio track. As TV receivers evolved into the primary source of home entertainment for a majority of the population, program providers and TV manufacturers cooperated to expand the capabilities of TV systems by providing additional services so that a wide range of video programs could be enjoyed by a more diverse population, including people with various disabilities or people speaking different languages. These services include closed captions (CC) to assist people with hearing disabilities; descriptive video services (DVS), which provide a narrative description of action or other scene related information (for example, facial expressions), to aid those with visual impairments; and multi-language audio tracks to allow a viewer to select a language he prefers when

viewing a program.

One problem with present-day TV receivers concerns programs with objectionable language that may be unsuitable for children. Program producers have responded to concerns regarding questionable content by providing ratings to alert parents to objectionable audio or visual content. However, when a program with an objectionable rating is broadcast, parents have only three alternatives: (1) turn off the TV receiver, (2) tune the TV receiver to a different channel, or (3) send children away. And in the absence of adult supervision, warnings in the form of ratings do not effectively keep children from watching a given program.

An effort to cure this deficiency is the "V-chip." V-chips can be installed in TV receivers and preset by parents so that when a program rated as inappropriate for children (as indicated by a code embedded in the composite video signal) is broadcast, both the audio and visual parts of the program are blocked . However, the V-chip is inflexible in that it applies across the board to all channels in the same way. In addition, the V-Chip blocks reception of the entire program whereas only certain portions of the program, or program dialogue, may be objectionable.

OBJECTIVES AND ADVANTAGES OF THE INVENTION

In view of the aforementioned disadvantages of the prior art, it is an objective of the present invention to provide a video signal processor such as a TV receiver that receives television programs containing alternative audio signals that have been edited for content and are thus more suitable for family

viewing.

Another objective of the invention is to provide a TV receiver that is capable of receiving alternative audio signals that are tailored to a demographic characteristic of the viewer such as his geographic location.

A further objective is to provide a TV receiver that receives alternative audio signals that are easily incorporated into a standard composite video signal.

Yet another objective is to provide a broadcasting system adapted to transmit different composite signals to different viewers based on the viewers' demographic characteristics.

Briefly, a video signal processor such as a TV receiver constructed in accordance with our invention processes a composite video signal received from a broadcaster that includes a video channel and a main audio channel which represent standard video and audio programs, and a secondary audio channel that carries an alternative audio track. In one embodiment of the invention, the alternative audio track is derived from the standard audio track, for example, by deleting dialog that may not be suitable for children and replacing the same with milder or more acceptable dialog. In another embodiment, the standard audio track may be directed to a generic audience while the alternative audio track may be tailored for a specific audience, based, for example, on geographic location.

Our invention further includes a broadcasting system in which several composite video signals are transmitted to TV receivers disposed at different geographic locations. All the composite video signals have the same video and

main audio channels but different alternative audio tracks.

Since the TV receiver includes a video signal processor formed of a tuner and output circuitry generating output video and audio signals, a TV screen and speakers, each of these elements can be provided separately. In this latter configuration, the video signal processor can be provided as a stand-alone device, or can be incorporated into other devices such as VCRs, personal video recorders, DVD players, etc.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows a block diagram of a conventional TV receiver receiving a composite video signal;

Fig. 1A shows diagrammatically the conventional video and audio channels imbedded in a composite video signal;

Fig. 2 shows a block diagram of a TV receiver constructed in accordance with this invention;

Fig. 2A shows diagrammatically the signals imbedded in a composite video signal in accordance with this invention;

Fig. 3 shows diagrammatically a comparison between the contents of a standard audio track and an alternative audio track; and

Fig. 4 shows a diagrammatic view of a broadcasting system with composite video signals being transmitted to TV receivers at different geographic locations.

DETAILED DESCRIPTION OF THE INVENTION

Fig. 1 shows a broadcasting system 10 in which a tower 12 sends a composite video signal CV to a conventional TV receiver 14. TV receiver 14 includes a tuner 16, a V-chip 18, a video decoder 20, an audio decoder 22, an SAP decoder 24 and a multiplexer 26. The audio decoder 22 SAP 24 and multiplexer 26 can be provided in a single integrated chip however, discrete elements are shown for the sake of clarity.

The TV receiver 14 is controlled by a remote control device 28 which sends a viewer's commands to the TV receiver 14 through an infrared link 30 and an IR receiver 32. Other communication means including ultrasonic or RF signals may be used as well. The remote control device 28 is used by the viewer to perform various functions such as channel selection, volume selection, muting, SAP preference and so on. The output of IR receiver 32 controls decoder 34, for example, to tune tuner 16 to a particular channel. In addition, the decoder 34 also generates control signals that control the multiplexer 26 to select either the main or the alternate audio track for the speakers 38, as discussed in more detail below.

As shown in Fig. 1A, the composite video signal CV received by receiver 14 may include a video, a main audio, a closed captioned (CC) and a secondary audio program (SAP) channel. The SAP channel carries either foreign language audio tracks (L) or descriptor video services (DVS) audio tracks. In each case, the audio tracks carried by the SAP channel are very different from the standard audio tracks on the main audio channel.

When the TV receiver 14 is turned on, the tuner 16 receives the composite video signal CV and its component channels, and sends them to the V-chip 18. The V-Chip (when activated) checks the rating of the program being received, and if it is acceptable then it sends the same to the video audio signal processing chip 20, the audio decoder 22 and the SAP decoder 24. The video signal decoder generates video signals for a TV screen 36.

The audio decoder 22 generates the audio track corresponding to the signals on the main audio channel. The SAP decoder generates the audio track from the SAP channel. These audio tracks are fed to the multiplexer 26 which selects one of these tracks for speakers 38 in accordance with the control signals received from decoder 34.

The TV receiver 14 is programmed by pressing a sequence of predetermined keys (not shown) on the remote control device 26. As part of this programming, an electronic latch (not shown) is set so that it is either on or off to indicate whether the SAP channels should be selected or not. When the SAP channel is selected, it is maintained as the 'active' audio channel by the multiplexer 26 (with the exception noted below) until it is de-selected by the latch through another setup or programming sequence.

If the SAP channel has not been selected, the multiplexer 26 automatically selects the standard audio track from decoder 22.

Typically, when the SAP channel has been selected, the SAP decoder 24 decodes and monitors the SAP channel. As long as appropriate SAP signals (typically FM signals) are received on this channel, they are decoded, and corresponding audio signals are provided to speakers 24. As discussed above,

the processed audio signal may be DVS or dialog in another language. If no SAP signal is received, the audio signal is muted. The multiplexer 26 may also be structured so that if the SAP channel has been selected and is present, then one of the output lines from the audio decoder p 22, for example, the output line for signal L, is used to output the SAP signal, while the other output line R is used to generate a monophonic version of the standard audio track. The following table depicts the typical operation of the audio decoder 22, the SAP decoder 24 and the multiplexer 26:

LEFT	RIGHT	SIGNAL RECEIVED	STEREO SELECTED	SAP SELECTED
MUTE	MUTE	POOR OR NOISY SAP	YES	NO
LEFT	RIGHT	STEREO	YES	NO
MONO	MONO	POOR OR NOISY STEREO	NO	YES
MONO	MUTE	POOR OR NOISY SAP	NO	YES
MONO	SAP	SAP	NO	YES
MONO	MUTE	POOR OR NOISY SAP	NO	YES

The content of the SAP channel is determined by the program provider of the particular program. As mentioned previously, the SAP channel may carry DVS or dialog in an alternate language.

In the present invention, the TV receiver 14A receives a composite video signal CVA which, as shown in Fig. 2A, is the conventional CV signal

modified by incorporating in the SAP an additional audio channel (AA). This additional audio channel carries an alternative audio track which may be derived from the standard audio track on the main audio channel. In some cases, the alternative audio track may be nearly identical to the standard audio track and synchronized to the video signal to preserve proper correspondence between its dialog and the video. The differences between the standard and alternative audio signals is that certain words or phrases in the standard audio signal are replaced by the producer, a subsequent distributor or a broadcaster with other words or phrases, or with nothing at all. For example, in one embodiment of the invention, words or phrases that may be objectionable for children may be either replaced with other words or phrases that are acceptable, or simply omitted. Therefore, the main audio channel in this instance carries a standard audio track that is more suited for mature audiences, while the additional audio channel contains dialog in the same language and with substantially the same content that is more suitable for children.

Regional preferences may dictate other kinds of changes to the standard audio track. For example, a commercial may be incorporated in a program with the main audio channel being generic to viewers in the United States, while the additional audio channel may be used for audio which is specific to Canada. Thus, viewers in the United States and Canada can watch the same program, but the viewers in Canada can listen to different audio than viewers in the United States.

Alternatively, the main audio channel may be used for audio with generic information applicable for all the viewers in the United States (for example, an

800 number for a product being advertised). The additional audio channel may then be used for alternative audio generic to specific locations. For example, the alternative audio may include the name or telephone number of a store in Los Angeles, New York, Atlanta, New Orleans, etc. Viewers in each of these locations receive a different additional audio channel.

Fig. 3 illustrates the content of the standard audio track on the main audio channel and the alternative audio tracks carried by the additional audio channel. For example, the top portion of this Figure may represent the standard audio track associated with a program for mature audiences and therefore may include several segments that are not suitable for children. It is expected that the number and duration of these segments may be generally small and may be somewhat randomly distributed between segments that are acceptable for all audiences. Therefore in Fig. 3 segments with acceptable language are designated as A segments, with B segments containing objectionable language. In other words, the standard audio track consists of a sequence of alternating A and B segments as shown, which can be represented as A1, B1, A2, B2, A3, B3, A4, B4, A5 . . . In Fig. 3 the sizes of the B segments are exaggerated for the sake of clarity, it being understood that they are generally much shorter than the A segments. More particularly, A segments may be several minutes or even hours long while the B segments may each be a couple of seconds long. Alternatively, the B segments may represent the portions of the standard audio track that may be selectively changed for various specific regions or audiences of specific demographic concentrations.

The producer, broadcaster or other intermediate party can generate the

alternative audio track which is a modified version of the standard audio track. As shown in Fig. 3, the alternative audio track is obtained by replacing the B segments in the standard audio track with new C segments. These C segments may contain alternative acceptable language to the objectionable language of the B segments. Thus, the alternative audio track may be represented as a sequence of A and C segments arranged in the order: A1, C1, A2, C2, A3, C3 etc. The A segments on the additional audio track are identical to the A segments on the main audio track. The C segments correspond in a one-to-one relationship to the B segments and each segment Cn has exactly the same length as the segment Bn that it replaces. Therefore, all the segments on both channels remain synchronized with the video signal.

The SAP is either enabled or disabled for all the program channels. Alter-natively, the SAP channel is enabled or disabled on a channel-by-channel basis as disclosed in commonly assigned copending application S.N. _____ filed _____ and entitled A TV RECEIVER WITH INDIVIDUALLY PROGRAMABLE SAP CHANNEL, incorporated herein by reference.

Preferably, the TV receiver 14A is provided with a parental supervisory latch 40. Latch 40 can be set by entering an appropriate code into remote control device 28 and transmitting the same to the decoder 34. The decoder 34 uses this code to generate a control signal for setting the latch 40.

After it has been set, latch 40 operates forces the multiplexer to select only the secondary audio track from the SAP and any control signals from the remote control device 28 during this period are ignored. In this manner, a parent can in effect lock the set 14A so that children can only hear the secondary audio track.

The parental supervisory latch 40 can be reset by entering a release code into the remote control device 28. Once the latch 40 is reset, the multiplexer 26 operates in a normal manner.

It has been assumed that the main audio channel is designated to carry the audio tracks for mature audiences and the alternative audio tracks on the additional audio channel are suitable for all family audiences, including children. Of course, the channels can be reversed so that the audio tracks that are family oriented are carried by the main channel and the audio tracks for mature audiences are carried by the additional audio channel. In this case, the latch 40 locks the multiplexer to allow only the main sound track to be heard.

As discussed above, the additional audio channel may be used to transmit alternative audio tracks that are customized for viewers in different geographic areas. Such a system is shown in Fig 4. In this system, a content provider 50 provides a composite video signal consisting of a video and a main audio channel to two different broadcasters 12A1 and 12A2. In this case, the main audio channel is generic to all viewers and geographic areas. The two broadcasters provide broadcasts to TV receivers 14A1and 14A2, disposed at different geographical locations. For example, TV receiver 14A1 may be in New York and TV receiver 14A2 may be in Los Angeles. Each broadcaster adds its own additional audio channel. For example, broadcaster 12A1 may add a track on the additional audio channel AA1 which includes alternative audio tracks that contain New York-specific information while broadcaster 12A2 may add an additional channel AA2 with alternative audio tracks that contain information specific to Los Angeles. The two TV receivers 14A1 and 14A2 can be set by the respective viewers to listen to either the main audio channel or the additional

audio channel, as desired.

In Fig. 2, the elements controlling the audio track being played, i.e., audio decoder 22, SAP decoder 24, multiplexer 26 and latch 40 are shown as discrete components for the sake of clarity. However, they may be combined into a single sound processing chip.

The TV receiver 14A described above includes in effect a video signal processor having a tuner and output circuitry generating output video and audio signals, a TV screen 36 and speakers 38. However, each of these elements may be provided separately. In this latter configuration, the video signal processor may be provided as a self-contained stand-alone unit, or may be incorporated into another device, such as a VCR, a DVD player, a personal video recorder.

Obviously, various modifications may be made to the invention without departing from the scope of the invention as defined in the appended claims.